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Two new anamorphic fungi and some microfungi recorded from 'El Ávila,' Venezuela

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Abstract — Two interesting fungi collected during investigations of microfungi on dead plant material in the mountains range 'Cerro El Ávila', Caracas, Venezuela, are described and illustrated. *Phaeodactylium biseptatum* anam. sp. nov. is distinguished by clavate, fusiform to narrowly ellipsoid, ventricose, 2-septate conidia with central cell

pale brown and subhyaline ends. A key to accepted *Phaeodactylium* species is provided. *Polyschema amoenum* is characterized by moniliform conidiophores and fusiform to navicular, 4–5-septate, smooth conidia, with two dark brown cells, the other conidial cells subhyaline.

Key words — conidial fungi, leaf litter, systematics, tropical rainforest

Introduction

During an expedition in 2006 to "Cerro El Ávila", near Caracas, Venezuela, two conspicuous anamorphic fungi from the genus *Phaeodactylium* and *Polyschema* were collected. Morphologically those fungi were distinctly different from previously described species and are therefore described as new species.

Materials and methods

Samples of plant litter collected in separate paper bags were taken to the laboratory where each was incubated at 25º C in Petri dishes placed inside 50 L plastic moist chambers containing 200 ml sterile water and 2 ml glycerol. Plant material was examined at regular intervals for the presence of microfungi. Mounts were prepared in polyvinyl alcohol-glycerol (8 g in 100 ml of water, plus 5 ml of glycerol) and measurements made at a magnification of × 1000. Micrographs were obtained with a Zeiss Axioscop 40 microscope. Herbarium specimens were deposited at the Simon Bolivar University (USB) and VEN.

Taxonomy

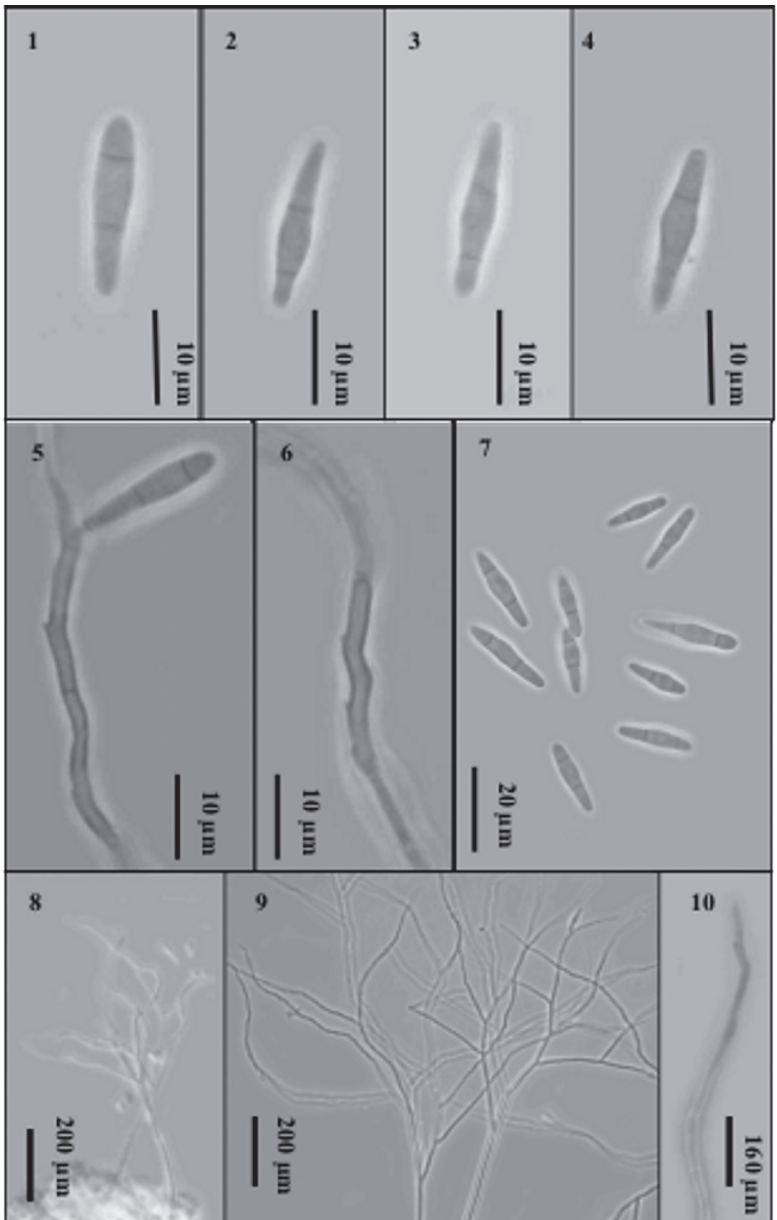
Phaeodactylium biseptatum R.F. Castañeda, Iturr. & Rob. Fernández, **anam. sp. nov.** Figs. 1–12

MycoBank MB 511938

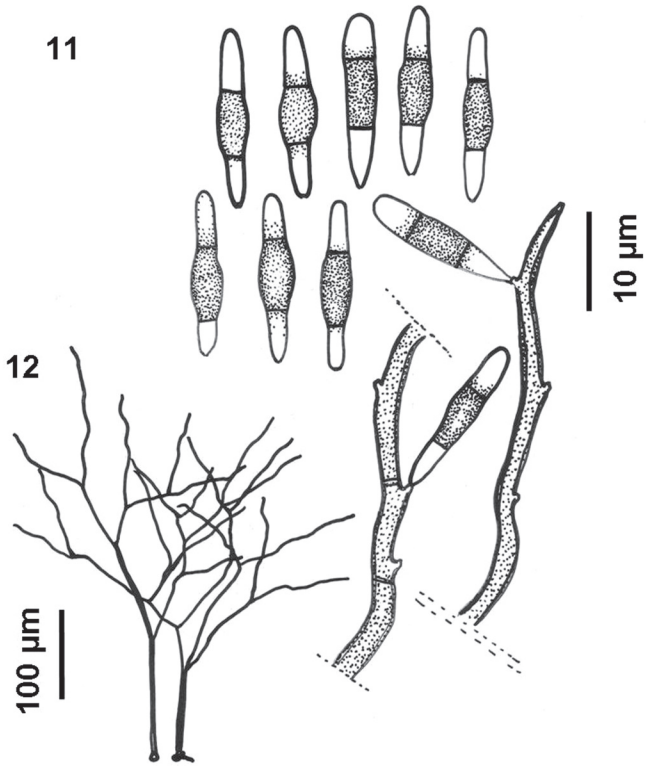
Coloniae in substrato naturali, effusae, pilosae, amphigenae, brunneae ad usque aureo-brunneae. Mycelium partim superficiale et partim in substrato immersum, ex hyphis septatis, ramosis, laevibus, dilute brunneis, 1–2 µm diam. Conidiophora macronemata, mononemata, fasciculata erecta, multi-septata, 350–440 µm altis, 6–7 µm crassis ad basim, brunnea infra, dichotome ramosa; ramis leviter geniculatis, flexuosis, pallide brunneis ad apicem. Cellulae conidiogenae polyblasticae, sympodiales, terminales et intercalares, indeterminatae, cum denticulis cylindricis, manifestis vel interdum inconspicuis praeditae. Secessio conidiorum schizolytica. Conidia solitaria, clavata, fusiformia vel anguste ellipsoidea, plerumque ventricosa ad cellula centralis, biseptata, acropleurogena, laevia, sicca. 10–14 × 2–3 µm, cum cellulis secunda brunneis et cetero dilute brunneis usque ad subhyalinis.

Etymology: Latin, *biseptatum*, referring to the number of conidial septa.

Colonies on the natural substratum effuse, hairy, amphigenous, brown to golden brown. Mycelium superficial and immersed composed of septate, branched, smooth-walled, 1–2 µm diam., pale brown hyphae. Conidiophores



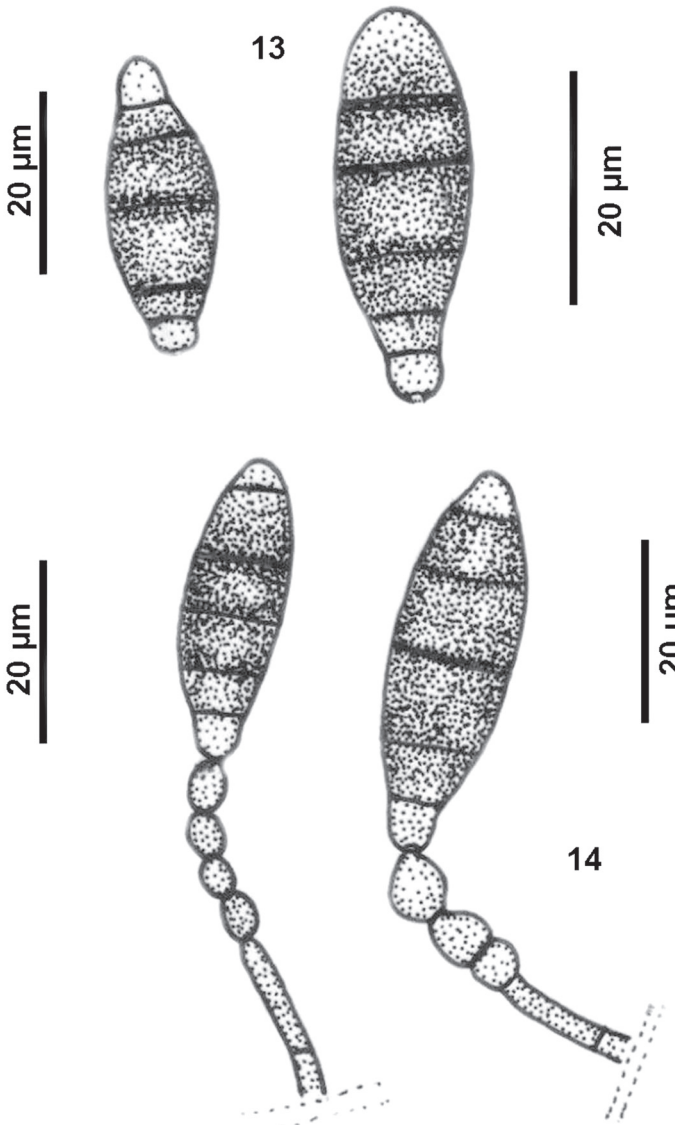
Figs. 1–10. *Phaeodactylium biseptatum*, photomicrographs from holotype (VEN 395750). Figs. 1–4, 7. Conidia. Figs. 5–6. 8,9 Conidiophores and conidiogenous cells. Scale is indicated by bars.



Figs. 11–12. *Phaeodactylium biseptatum*, drawings from holotype (VEN 395750). Fig. 11. Conidiophores. Fig. 12. Conidiogenous cells and conidia. Scale is indicated by bars.

macronematous, mononematous, fasciculate, erect, dichotomously branched, multi-septate, brown at the base, pale brown towards the apex of flexuous, slightly geniculate branches, smooth, 350–440 µm tall, 6–7 µm wide at the base. Conidiogenous cells holoblastic, multilocal, terminal and intercalary, sympodially proliferating, indeterminate, 18.7–35 × 2.0–2.5 µm, with conspicuous or sometimes inconspicuous cylindrical denticles. Conidial secession schizolytic. Conidia solitary, clavate, fusiform or narrowly ellipsoid, but mostly equilaterally ventricose at center, 2-septate, acropleurogenous, smooth, 10–14 × 2–3 µm, pale brown to subhyaline ends, but with second cells brown, dry. Teleomorph: unknown.

Matrix: **VENEZUELA, Caracas, "Cerro El Ávila"**, Parque Nacional El Ávila, near "Lagunazo" camping field, on decaying leaf of *Clusia minor* L. 10º 33' N and 66º 51' W, 2243 m alt, 17.VI.2006, coll. R. Fernández. **HOLOTYPE**: VEN 395750.



Figs. 13–14. *Polyschema amoenum*, drawings from holotype (VEN 395758).
Fig. 13. Conidia. Fig. 14. Conidia still attached to conidiogenous cells.
Scale is indicated by bars.

Comments: The genus *Phaeodactylium* was introduced by Agnihothrudu (1968) with *P. venkatesamum* as type species, but Ellis (1971) considered

this species a synonym of *Dactylium alpiniae* Sawada and made the new combination *P. alpiniae*; this species has clavate, hyaline to subhyaline, 3-septate, 16–25 × 6–9 µm conidia that are distinct from those of *P. biseptatum*. *Phaeodactylium curvularioides* Matsush. (1980) has branched conidiophores which resemble a tree in shape, but the conidia are obovoid, 3-septate, 13–22 × 5–10 µm and lack a ventricose central cell, clearly differentiating it from *P. biseptatum*. Calduch et al. (2002) proposed a new genus *Phaeobotrys* based on *Phaeodactylium acutisporum* Matsush. (1993) and provided a key on related genera with denticulate conidiogenous loci.

Key to accepted *Phaeodactylium* species

1 Conidia 3-septate 2

Conidia 2-septate, clavate, fusiform or narrowly ellipsoid, but slightly ventricose at center, 10–14 × 2–3 µm, smooth, pale brown to subhyaline .... *P. biseptatum*

2(1) Conidia ellipsoidal or clavate, tapered to the base, 16–25 × 6–9 µm, colorless or subhyaline, smooth ..... *P. alpiniae*

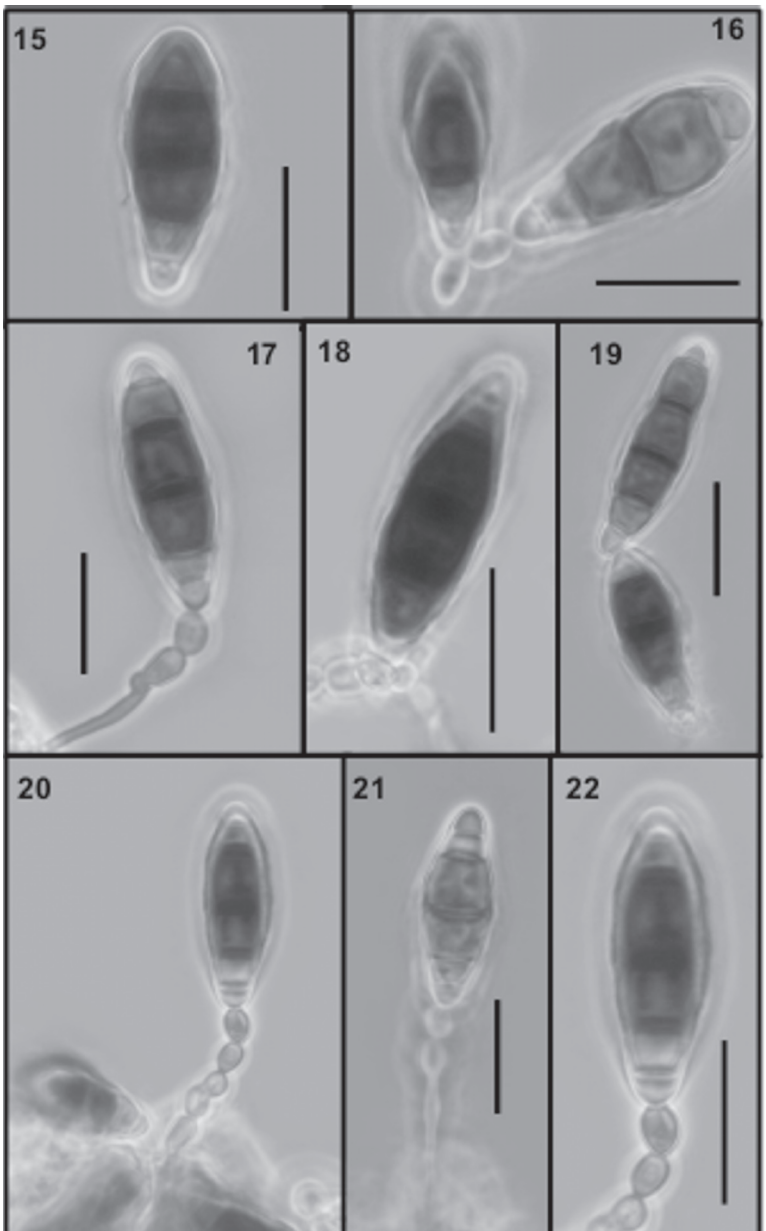
Conidia obovoid, 13–22 × 5–10 µm, with brown median cells and subhyaline ends, smooth ..... *P. curvularioides*

Polyschema amoenum R. F. Castañeda, Iturr. & Minter, **anam. sp. nov.** Figs. 13–22
MycoBank MB 511939

Coloniae in substrato naturali effusae, atrobrunneae vel nigrae. Mycelium partim superficiale et partim in substrato inmersum, ex hyphis septatis, ramosis, laevibus, brunneis, 1.5–3.0 µm. Conidiophora semiconspicua, mononemata, erecta vel prostrata, plerumque moniliformia, laevia, 25–50 × 3–4 µm, brunnea. Celulae conidiogenae monotreticae, terminales, globosa, doliiformes ad usque ellipsoidales, determinatae, interdum sympodialiter proliferantes, 5–8 × 3.0–3.5 µm, pallide brunneae, laeves. Secessio conidiorum schizolytica. Conidia solitaria, plerumque, fusiformia usque ad navicularia, raro clavata, plerumque acrogena, interdum acropleurogena, 4- ad 5-septata, laevia, 25–29 × 8–10 µm, atrobrunnea vel nigra ad cellulis centralis et utrimque dilute brunnea, sicca.

Etymology: Latin, *amoenus,* meaning delightful and beautiful, in reference to the appearance of conidia and conidiogenous cells.

Colonies on the natural substrate effuse, dark brown or black. Mycelium superficial and immersed. Hyphae septate, branched, smooth-walled, brown, 1.5–3.0 µm. Conidiophores semi-macronematous, mononematous, erect or prostrate, mostly moniliform towards the apex, smooth-walled, 25–50 × 3–4 µm, brown. Conidiogenous cells monotretic, globose, doliiform to ellipsoid, determinate, terminal, sometimes sympodially proliferating become intercalary, 5–8 × 3.0–3.5 µm, pale brown, smooth-walled. Conidial secession schizolytic. Conidia solitary, mostly fusiform to navicular, rarely clavate, 4- to 5-septate, smooth-walled, 25–29 × 8–10 µm, mostly acrogenous,



Figs. 15–22. *Polyschema amoenum*, photomicrographs from holotype (VEN 395758). Figs. 15, 16, 19. Conidia. Figs. 17, 18, 20–22. Conidia still attached to conidiogenous cells. Scale is indicated by bars.

sometimes acropleurogenous, dark brown to black, but pale brown at end cells, dry. Teleomorph: unknown.

Matrix: **VENEZUELA, Caracas, "Cerro El Ávila",** Parque Nacional El Ávila, near "Lagunazo" camping field, on twig of unidentified plant. 10º 33' N and 66º 51'W, 2243 m alt, 17.VI.2006, coll. R. Fernández. C06/63-1 = **HOLOTYPE**: VEN 395758.

Comments: Arias et al. (2008) documented the eighteen known species of *Polyschema* and described *P. nigroseptatum* R.M. Arias et al. Three published species of *Polyschema* with smooth, 4–5-septate conidia are: *P. clavulatum* (Cooke & Harkn.) M.B. Ellis, *P. nigroseptatum* and *P. obclaviforme* R.F. Castañeda & Decock (Table 1). None of these species has fusiform to navicular, 25–29 × 8–10 µm conidia such as *P. amoenum*.

Table 1. *Polyschema* species with smooth, 4-5 septate conidia

Species	Conidial shape	Conidial size (µm)
P. clavulatum	clavate	30–46 × 12–16
P. nigroseptatum	clavate to ovoid	41–45 × 19–22
P. obclaviforme	obclavate	30–48 × 6–7

Other microfungi recorded from mountain range "El Ávila", Caracas, Venezuela.

Acrodictys bambusicola M.B. Ellis, Mycol. Pap. 79: 6 (1961).
On twig of unidentified plant, 17.VI.2006, R. Fernández, USB C06/53-1b.

Acumispora phragmospora Matsush., Matsush. Mycol. Mem. 1: 3. (1980)
On decaying leaves of *Clusia rosea* Jacq., 28 .VII. 2006, L. Lucena, USB C06/82-2.

Anungitopsis triseptata (Matsush.) R.F. Castañeda & W.B. Kendr., Univ. Waterloo Biol. Ser. 35: 12 (1991).
On submerged decaying leaves of unidentified plant, 21.VI.2006, M. Mardones and R. Fernández, USB C06/75.

Arachnophora uberisporoides R. F. Castañeda, W. Gams & Saikawa, Nova Hedwigia 64 (3–4): 479 (1997).
On submerged decaying leaves of unidentified plant, 21.VI.2006, M. Mardones and R. Fernández, USB C06/73.

Arachnophora hughesii R.F. Castañeda & Guarro, Can. J. Bot. 76(9): 1584 (1999) ["1998"].
On twig of unidentified plant, 17.VI.2006, R. Fernández, USB C06/53-1.

Arthrobotrys oligospora Fresen. var. ***oligospora***, Beitrage zur Mykologie 1: 18 (1850).
On worm from soil sample, 17.VI.2006, R. Fernández, USB C06/44

Beltrania querna Harkn., Bull. Calif. Acad. Sci. 1: 39 (1884).
On decaying leaves of unidentified plant, 17.VI.2006, R. Fernández, USB C06/31-7.

Beltraniella havanensis (Hol.-Jech.) Matsush., Matsush. Mycol. Mem. 5: 5 (1987).
On decaying leaves of *Clusia rosea* Jacq., 28 .VII. 2006, L. Lucena, USB C06/84.

Beltraniella japonica Matsush., Icon. microfung. Matsush. lect. (Kobe): 15 (1975).
On decaying leaves of *Clusia rosea* Jacq., 28 .VII. 2006, L. Lucena, USB C06/84-1a.

Beltraniella portoricensis (F. Stevens) Piroz. & S.D. Patil, Can. J. Bot. 48(3): 575 (1970).
On decaying leaves of *Clusia rosea* Jacq., 28 .VII. 2006, L. Lucena, USB C06/103.

Beltraniopsis asperisetifera Matsush., Microfungi of the Solomon Islands and Papua-New Guinea (Osaka): 8 (1971).
On decaying leaves of *Clusia rosea* Jacq., 28 .VII. 2006, L. Lucena, USB C06/85.

Beltraniopsis ramosa R.F. Castañeda, Revta Jardín Bot. Nac., Univ. Habana 6(1): 53 (1985).
On decaying leaves of *Clusia rosea* Jacq., 28 .VII. 2006, L. Lucena, USB C06/86.

Blastophorum truncatum Matsush., Microfungi of the Solomon Islands and Papua-New Guinea (Osaka): 8 (1971).
On decaying leaves of *Clusia rosea* Jacq., 28 .VII. 2006, L. Lucena. C06/82-1.

Brachydesmiella biseptata G. Arnaud ex S. Hughes **var. *biseptata***, Can. J. Bot 39: 1095 (1961).
On dead stems of *Bambusa vulgaris*, 20 .XI. 2007, R. Fernández, USB C07/108.

Brachydesmiella eugecapiellana R.F. Castañeda, Iturr. & Saikawa, Mycotaxon 85: 212 (2003).
On submerged decaying leaves of unidentified plant, 21.VI.2006, M. Mardones and R. Fernández, USB C06/76.

Cacumisporium pleuroconidiophorum (Davydkina & Melnik) R.F. Castañeda, Heredia & Iturr., Mycotaxon 100: 332 (2007).
On submerged twig of unidentified plant, 17.VI.2006, R. Fernández, USB C06/36.

Chaetendophragmia triangularis Matsush. var. ***triangularis***, Microfungi of the Solomon Islands and Papua-New Guinea (Osaka): 12 (1971).
On decaying leaves of unidentified plant, 17.VI.2006, R. Fernández, USB C06/31-4a.

Chaetopsis prosbosciophora DiCosmo, S.M. Berch & W.B. Kendr., Mycologia 75(6): 962 (1983).
On decaying leaves of unidentified plant, 17.VI.2006, R. Fernández, USB C06/45-5.

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On decaying leaves of *Clusia rosea*, 28 .VII. 2006, L. Lucena, USB C06/90-1

Coniosporium memorandum (Penz. & Sacc.) M.B. Ellis, Mycol. Pap. 125: 2 (1971).
On dead leaves of *Clusia rosea* Jacq. , 28 .VII. 2006, L. Lucena, USB C06/82-1a.

Corynespora kamatii (V.G. Rao) M.B. Ellis, More Dematiaceous Hyphomycetes (Kew): 376 (1976).
On twig of unidentified plant, 28 .VII. 2006, L. Lucena, USB C06/108-1.

Corynesporopsis antillana R.F. Castañeda & W.B. Kendr., Univ. Waterloo Biol. Ser. 33: 15 (1990).
On decaying leaves of unidentified plant, 28 .VII. 2006, L. Lucena, USB C06/108.

Dactylaria nectandrae R.F. Castañeda & W.B. Kendr., Univ. Waterloo Biol. Ser. 35: 30 (1991).
On decaying leaves of unidentified plant, 17.VI.2006, R. Fernández, USB C06/31-2.

Dictyochaeta anamorph ***Chaetosphaeria pulchriseta*** S. Hughes, W.B. Kendr. & Shoemaker, N.Z. Jl Bot. 6: 356 (1968).
On twig of unidentified plant, 17.VI.2006, R. Fernández, USB C06/88-1.

Dictyochaeta fertilis (S. Hughes & W.B. Kendr.) Hol.-Jech., Folia geobot. phytotax. 19(4): 426 (1984).
On decaying leaves of unidentified plant, 28 .VII. 2006, L. Lucena, USB C06/108-2.

Dictyochaeta novae-guineensis (Matsush.) A.I. Romero, Boln Soc. argent. Bot. 22(1–4): 76 (1983).
On dead branch of unidentified plant, 21.VI.2006, M. Mardones and R. Fernández, USB C06/78.

Dictyochaeta simplex (S. Hughes & W.B. Kendr.) Hol.-Jech., Folia geobot. phytotax. 19(4): 434 (1984).
On decaying leaves of unidentified plant, 17.VI.2006, R. Fernández, USB C06/38-1.

Dictyochaeta triseptata (Matsush.) R.F. Castañeda, Fungi Cubenses (La Habana): 8 (1986).
On rotten rachis of unidentified palm tree, 17.VI.2006, R. Fernández. C06/64-1

Endophragmiella tripartita S. Hughes, N.Z. Jl Bot. 17(2): 154 (1979).
On rotten rachis of unidentified palm tree, 17.VI.2006, R. Fernández. C06/46-1

Ellisembia flagelliformis (Matsush.) W.P. Wu, *Sporidesmium*, *Endophragmiella* and related genera from China (Fungal Diversity Press, Thailand): 127 (2005).
Ex C60/99, on decaying leaves of *Clusia rosea* Jacq., 28.VII.2006, L. Lucena.

Exserticlava vasiformis (Matsush.) S. Hughes, N.Z. Jl Bot. 16(3): 332 (1978).
On rotten rachis of unidentified palm tree, 17.VI.2006, R. Fernández, USB C06/47-2.

Helicosporium aureum (Corda) Linder, Ann. Mo. bot. Gdn 16: 279 (1929).
On decaying leaves of unidentified plant, 17.VI.2006, R. Fernández, USB C06/51.

Henicospora coronata B. Sutton & P.M. Kirk, Trans. Br. Mycol. Soc. 75(2): 249 (1980).
On submerged decaying leaves of unidentified plant, 21.VI.2006, M. Mardones and R. Fernández, USB C06/77-3.

Idriella rara R.F. Castañeda, Deuteromycotina de Cuba, Hyphomycetes (La Habana) 2: 6 (1985).
On decaying leaves of *Syzygium jambos* (L.) Alston, 28 .VII. 2006, L. Lucena, USB C06/83.

Idriella tropicalis Lunghini & Rambelli, G. bot. ital., n.s. 112(3): 185 (1978).
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Lauriomyces heliocephalus (V. Rao & de Hoog) R.F. Castañeda & W.B. Kendr., Univ. Waterloo Biol. Ser. 32: 26 (1990).
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Lauriomyces ventricosus (R.F. Castañeda) R.F. Castañeda & W.B. Kendr., Univ. Waterloo Biol. Ser. 32: 26 (1990).
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On basidiomata of *Cantharellus* sp. 17.VI.2006, R. Fernández, USB C06/30-1.

Menisporopsis anisospora R.F. Castañeda & Iturr., Cryptogamie Mycol. 22: 260 (2001).
On decaying rachis of unidentified palm tree, 17.VI.2006, R. Fernández, USB C06/64

Menisporopsis novae-zelandiae S. Hughes & W.B. Kendr., N.Z. Jl Bot. 6: 369 (1968).
On decaying leaves of unidentified plant, 17.VI.2006, R. Fernández, USB C06/31.

Mirandina flagelliformis Matsush., Matsush. Mycol. Mem. 5: 453 (1987)
On decaying leaves of unidentified plant, 17.VI.2006, R. Fernández, USB C06/60-1.

Myrothecium cinctum (Corda) Sacc., Syll. fung. (Abellini) 4: 751 (1886).
On decaying leaves of *Bambusa vulgaris* Schrad., 28 .VII. 2006, L. Lucena, USB C80/105

Oidiodendron maius G.L. Barron var. ***maius***, Can. J. Bot. 40: 600 (1962).
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Parasympodiella clarkii B. Sutton, Trans. Br. Mycol. Soc. 71(1): 167 (1978).
On decaying leaves of unidentified plant, 17.VI.2006, R. Fernández, USB C06/31-5

Periconiella ilicis P.M. Kirk, Trans. Br. Mycol. Soc. 80(3): 458 (1983).
On decaying leaves of unidentified plant, 17.VI.2006, R. Fernández, USB C06/59

Phragmocephala prolifera (Sacc., M. Rousseau & E. Bommer) S. Hughes, N.Z. Jl Bot. 17(2): 164 (1979).
On decaying leaves of unidentified plant, 17.VI.2006, R. Fernández, USB C06/41

Piricaudiopsis elegans J. Mena & Mercado, Acta Bot. Cubana 51: 2 (1987).
On twig of unidentified plant, 17.VI.2006, R. Fernández, USB C06/53

Pleurocatena foliicola Aramb. & Gamundí, Nova Hedwigia, 84: 390 (2007).
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Ramichloridium schulzeri (Sacc.) de Hoog var. ***schulzeri***, Stud. Mycol. 15: 64 (1977).
On decaying leaves of *Clusia rosea* Jacq., 28.VII.2006, L. Lucena, USB C80/95

Repetophragma filiferum (Piroz.) R.F. Castañeda, Gusmão & Heredia, Mycotaxon 95: 269 (2006).
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Selenodriella fertilis (Piroz. & Hodges) R.F. Castañeda & W.B. Kendr., Univ. Waterloo Biol. Ser. 33: 34 (1990).

Subulispora procurvata Tubaki, Trans. Mycol. Soc. Japan 12(1): 20 (1971).
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Speiropsis scopiformis Kuthub. & Nawawi, Trans. Br. Mycol. Soc. 89(4): 584 (1987).
On submerged decaying leaves of unidentified plant, 21.VI.2006, M. Mardones and R. Fernández, USB C06/108.
On rotten rachis of unidentified palm tree, 17.VI..2006, R. Fernández, USB C06/47-3a.

Stachybotrys longispora Matsush., Icon. microfung. Matsush. lect. (Kobe): 145 (1975).
Ex C60/91, on decaying leaves of *Clusia rosea* Jacq., 28 .VII. 2006, L. Lucena.

Staheliella nivea R.F. Castañeda & G.R.W. Arnold, Feddes Repert. Spec. Nov. Regni Veg. 97(1–2): 84 (1986).
On decaying leaves of unidentified plant, 28.VII. 2006, L. Lucena, USB C60/108-4.

Triramulispora gracilis Matsush., Icon. microfung. Matsush. lect. (Kobe): 158 (1975).
On setae of *Beltraniella havanensis* on submerged leaves of *Clusia rosea* Jacq., 28.VII. 2006, L. Lucena, USB C06/90.

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On decaying leaves of *Clusia rosea* Jacq., 28.VII. 2006, L. Lucena, USB C60/96.

Zygosporium echinosporum Bunting & E.W. Mason, Mycol. Pap. 5: 135 (1941).
On decaying leaves of *Clusia rosea* Jacq., 28.VII. 2006, L. Lucena, USB C60/91.

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